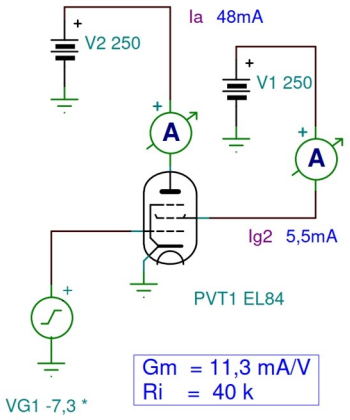
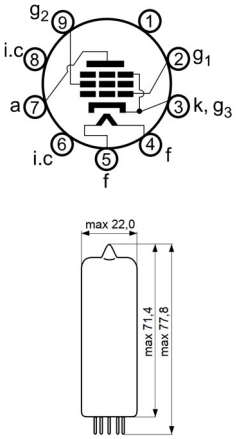
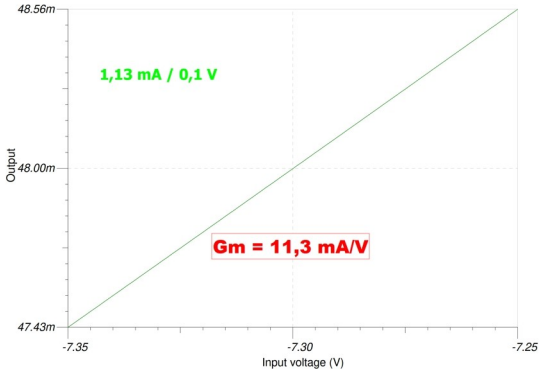
EL84 A. F. Output Pentode SPICE Macro Model

Typical Characteristics

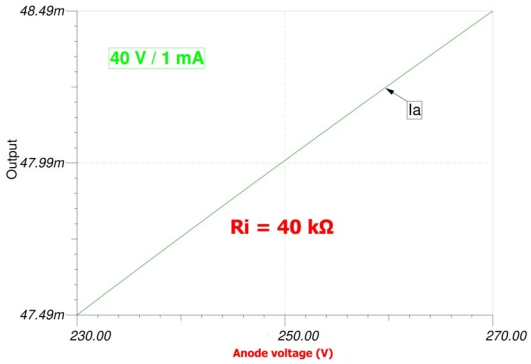




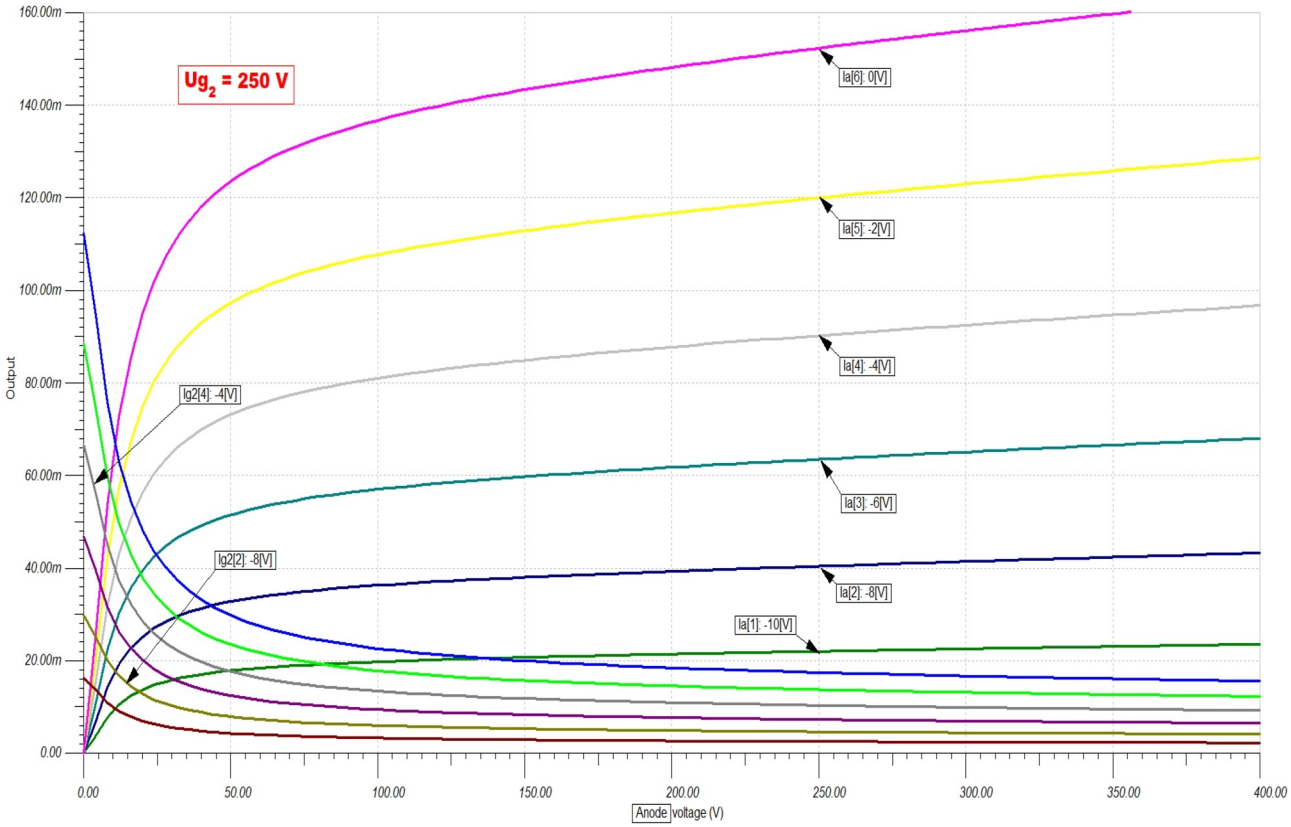
Transfer characteristic around the operating point



Output characteristic – local slope



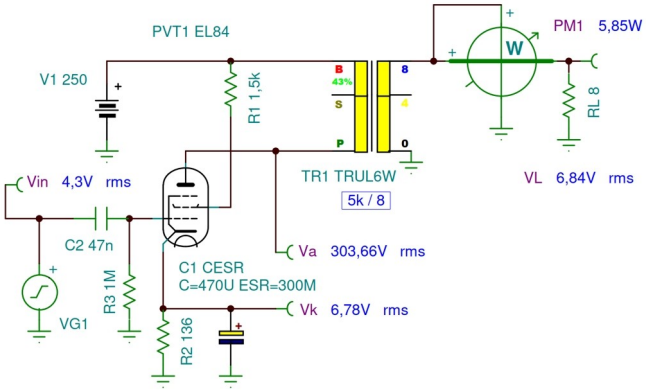
Output Characteristics

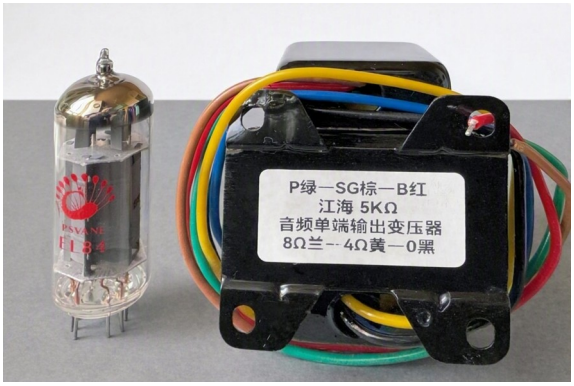


Operating Condition With Continuous Sine Wave Drive

When you drive a single-ended pentode power stage with a steady, full level sine wave, the screen grid (G_2) current shoots up at the power limit. Under these conditions the screen can exceed its rated dissipation (P_{G2}). To keep the screen safe, we insert a resistor between G_2 and the supply rail. This takes a small bite out of the maximum output power, but it keeps P_{G2} comfortably below about 2 W.

With real musical program material, the peaks are short and the average power is far lower, so the screen never sees this kind of sustained stress. In other words, this is a bench-test problem, it only shows up with continuous, full-power sine wave drive.





The TR1 output transformer happens to be a 43% ultra-linear type simply because it was the only unit available with a 5 kΩ primary and a 6 W rating. In a single-ended pentode build, though, that UL tap doesn't really buy you much, the distortion reduction is modest, and the tradeoff in output power isn't worth it. For this design, a straight pentode connection with global negative feedback delivers cleaner results and makes better use of the tube's available headroom. So even though the transformer is 'ultra-linear capable'. I'm running it in conventional pentode mode here. (When used as a pair in an ultra-linear push-pull configuration with 43% distributed loading the output could reach 10 W with 0.9 % total harmonic distortion.)

Transient Analysis